Past, Present and Future of Near-Infrared Imaging

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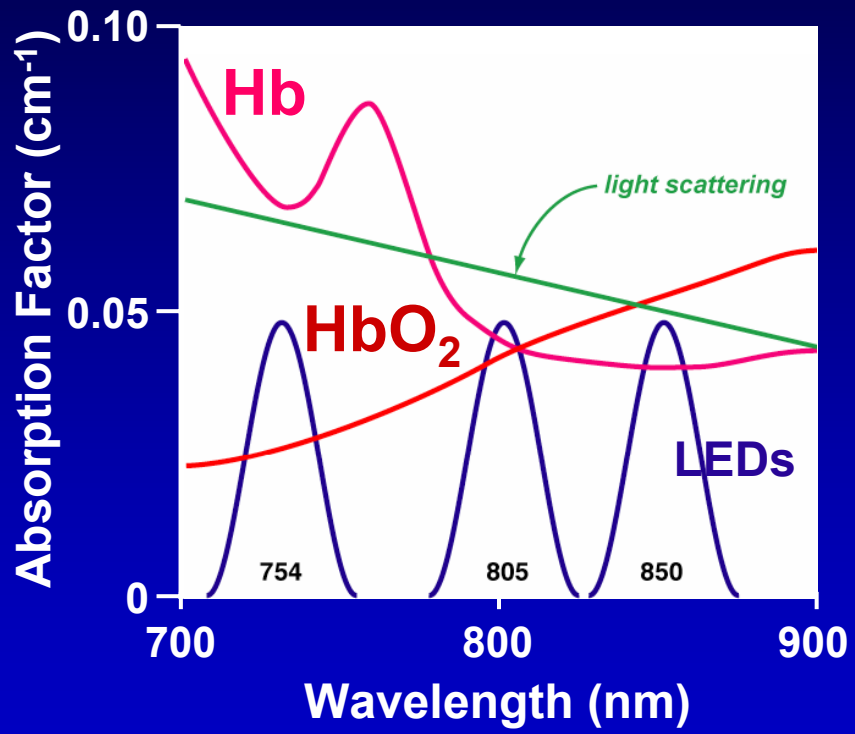
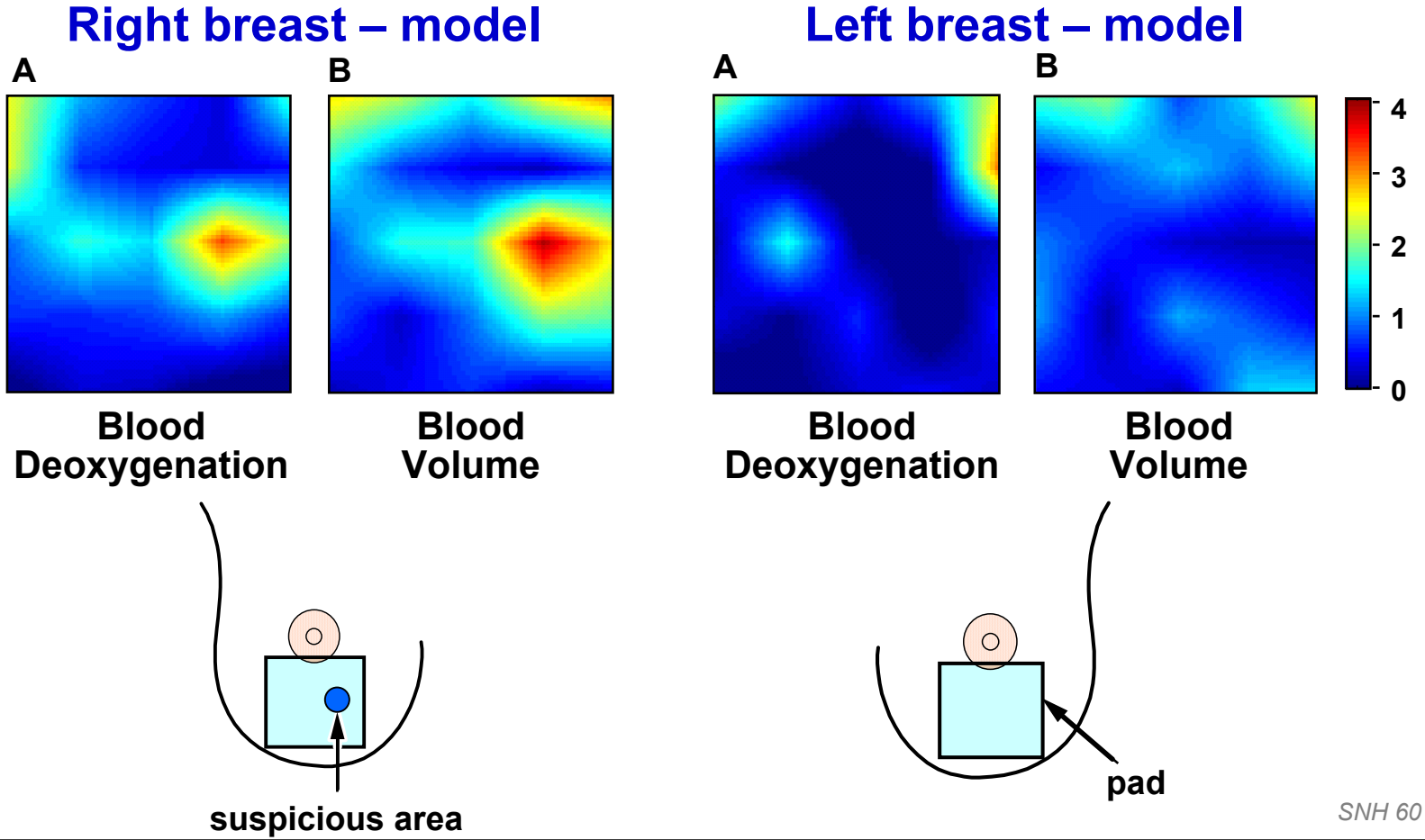
	Tumor/Tissue Ratio
Sensitivity/Specificity	
a PPV, NPV >90%	
Intrinsic Signals	
Angiogenesis	
Blood volume	~ 2
ICG Occupancy	~ 3
Hypermetabolism	
Deoxygenation of hemoglobin	2
Increased Fluorescence of Glucose	> 3
Extrinsic Probes	
Blood Pool -- ICG, FDA approved	2-3
NIR - Molecular Beacons	
Targeted cytate, LDL, Cathepsin B (ordinary, stealth)	>10



BC 368b

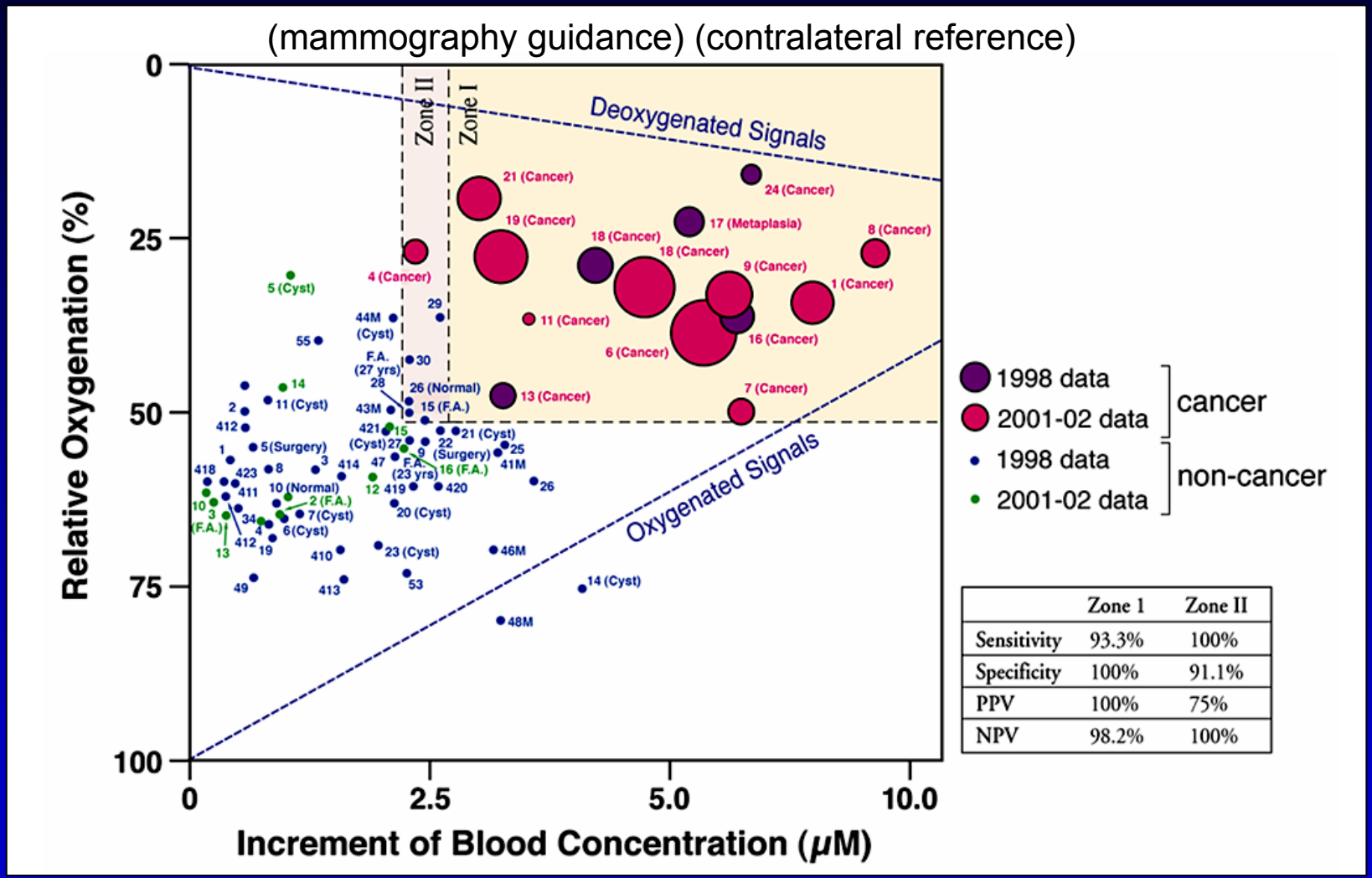
Amplitude Cancellation System Human Breast Test

(AS:24 12/10/97)



Dual Wavelength Amplitude Cancellation (AC-TM) Imager

2D Angiogenesis vs. Hypermetabolism Imagery, 71 subjects (15 cancers)



	Zone 1	Zone II
Sensitivity	93.3%	100%
Specificity	100%	91.1%
PPV	100%	75%
NPV	98.2%	100%

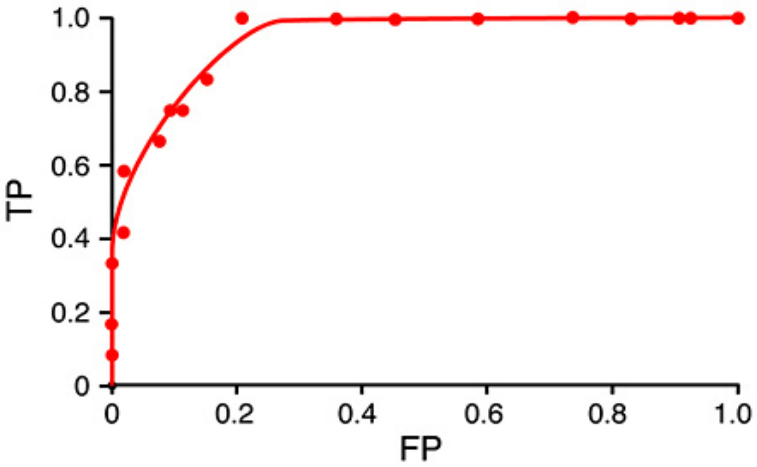
	Zone 1	Zone II
Sensitivity	**91.7%**	**100%**
Specificity	**100%**	**90.6%**

	Zone 1	Zone II
PPV	**100%**	**70.9%**
NPV	**98.1%**	**100%**

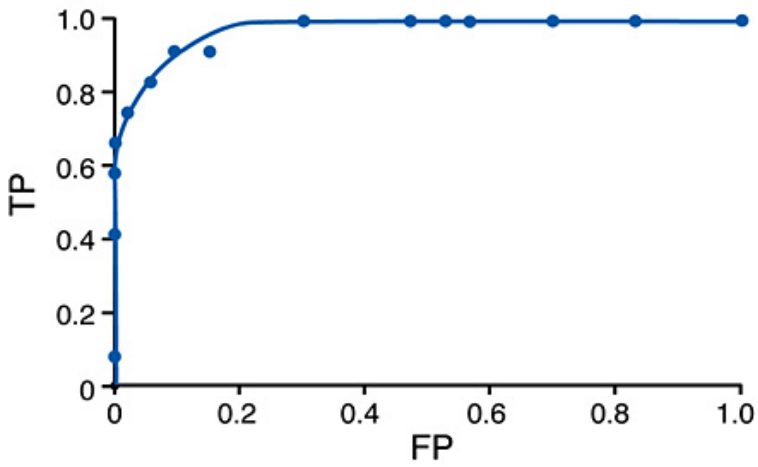
Chance '03

Analysis of 71 Subjects with Continuous Wave Near Infrared Image

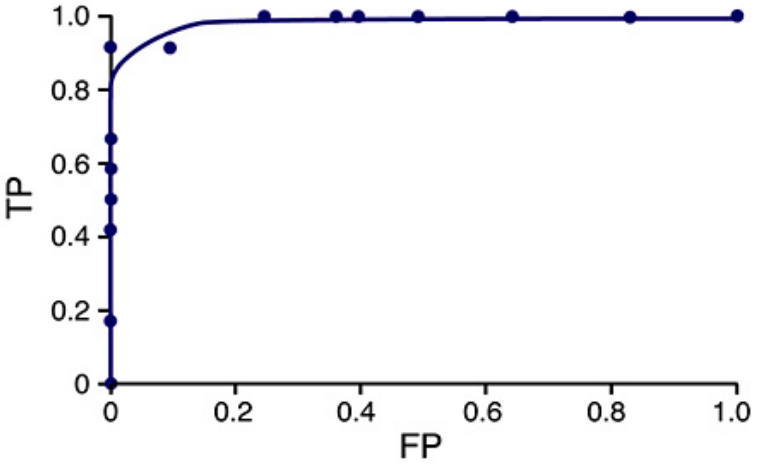
Receiver Operator Curve of Blood Volume



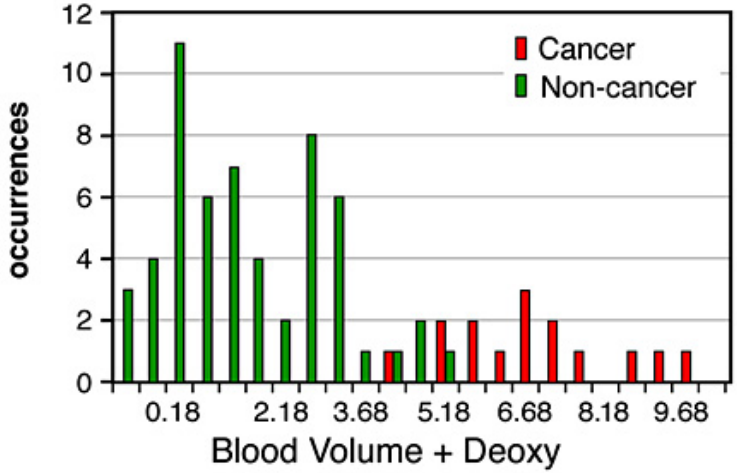
Receiver Operator Curve of Deoxygenation



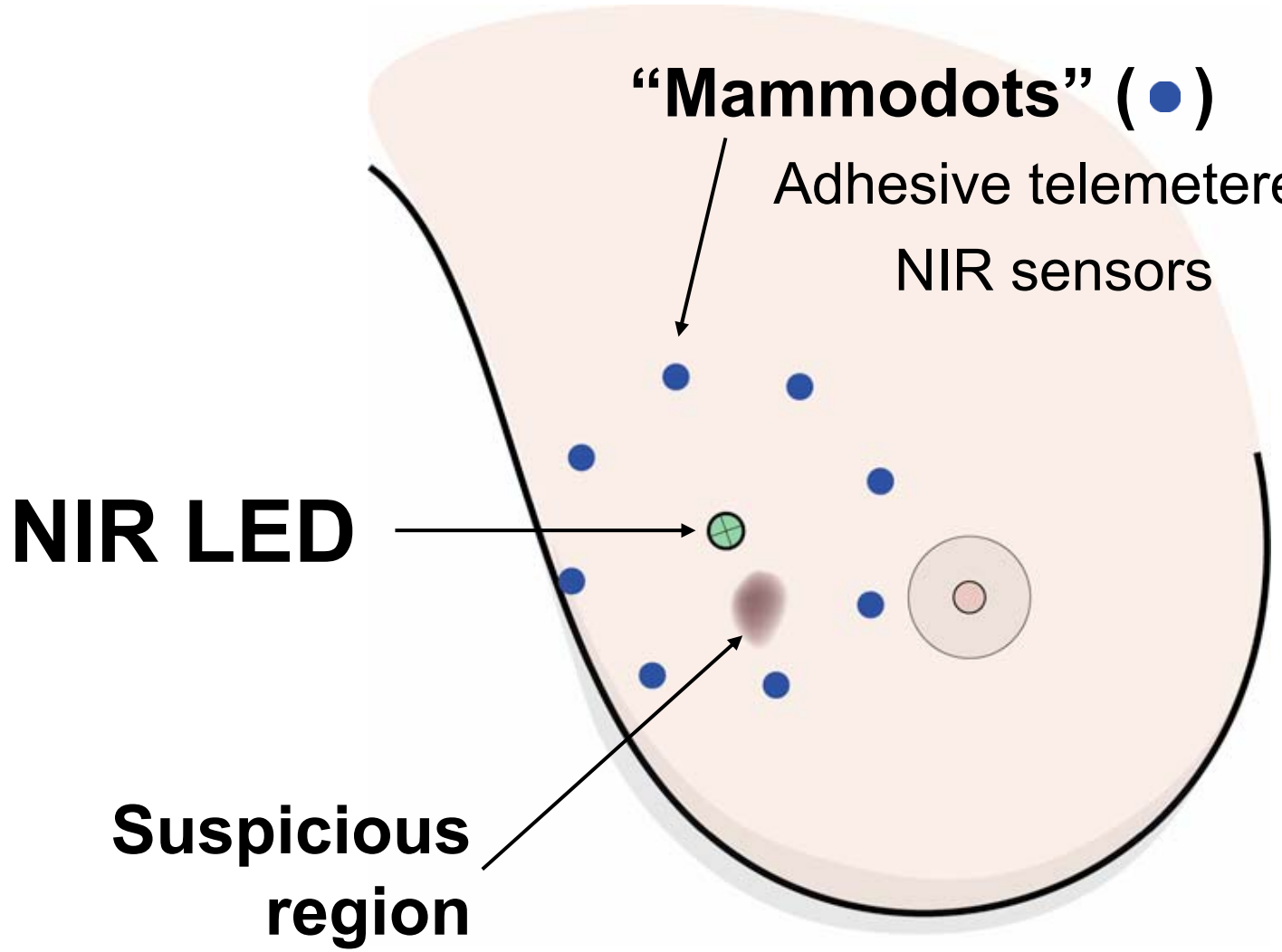
Receiver Operator Curve of Blood Volume and Deoxygenation



Breast Test Imaging

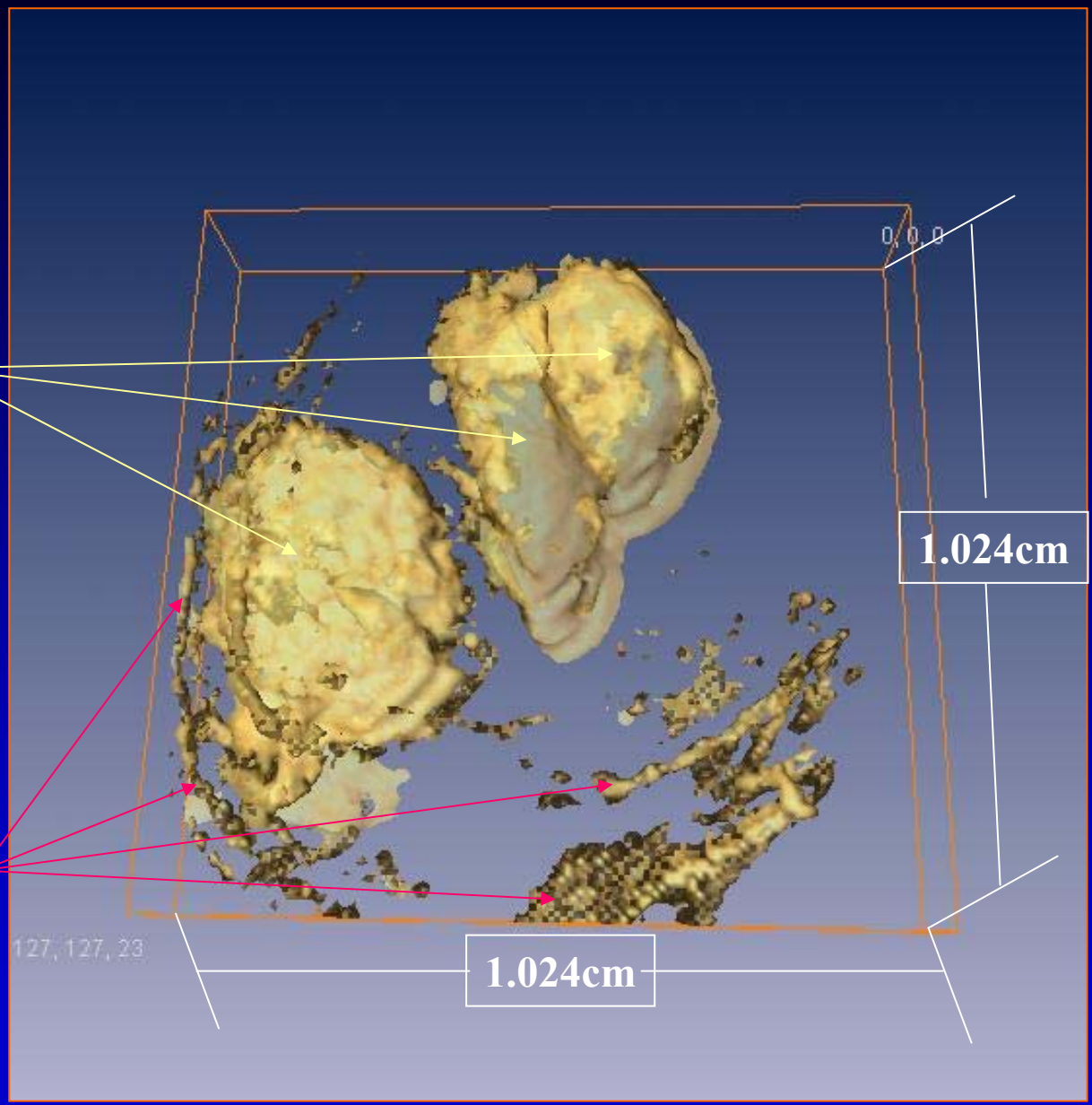


The possibilities of nanotechnology



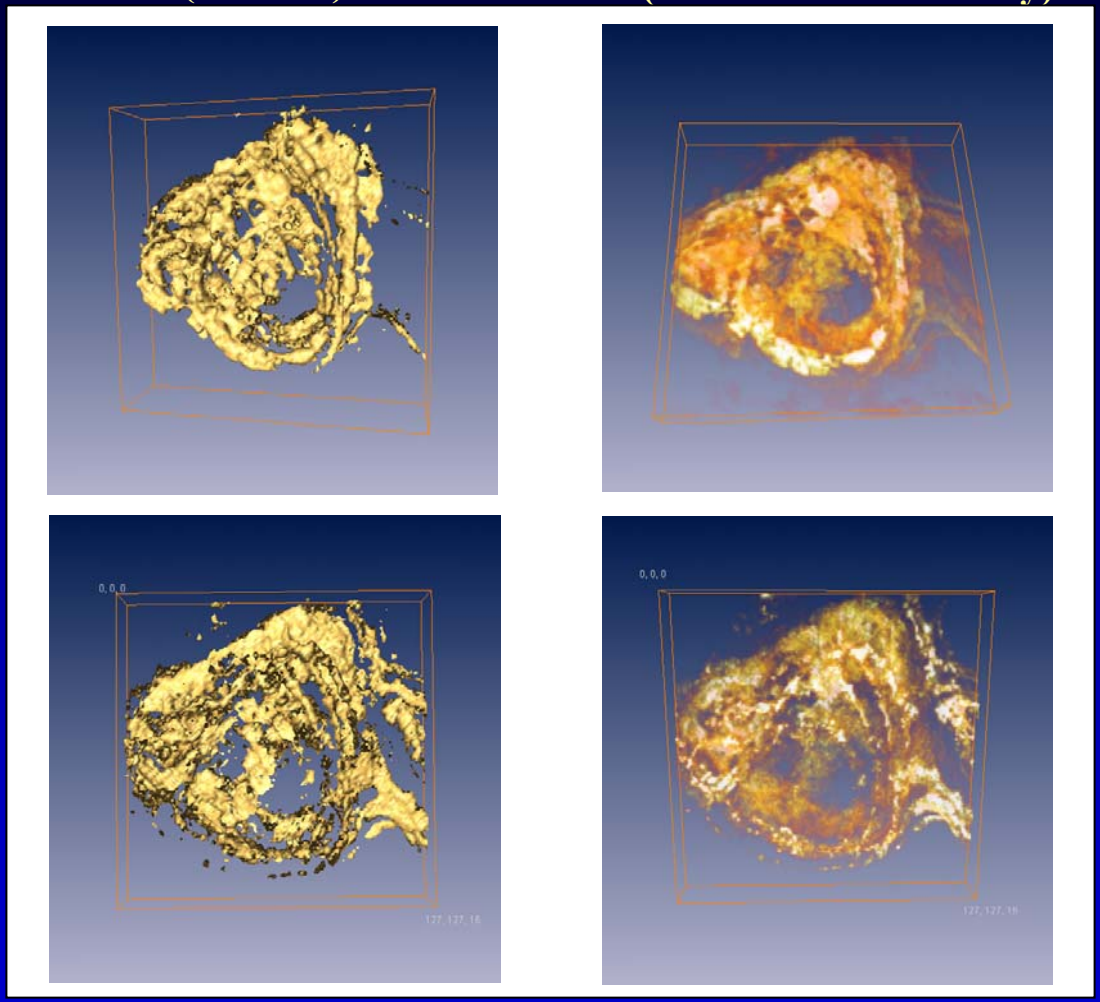
BC 469

NADH signal of Rif-1 Tumor



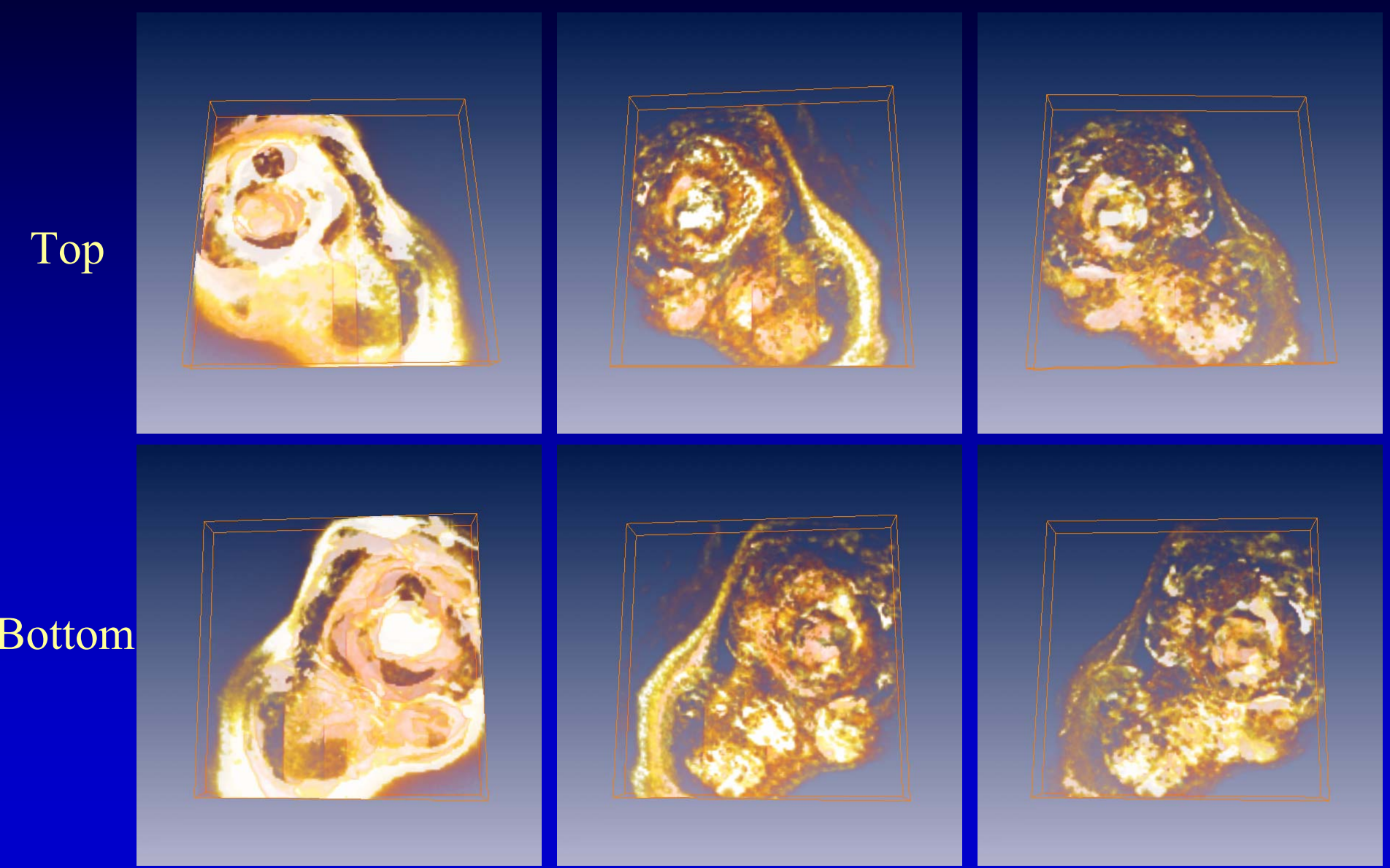
*Depths:200um to 3100um below skin surface

3D Fluorescent Images of c-MYC Induced Mammary Tumor



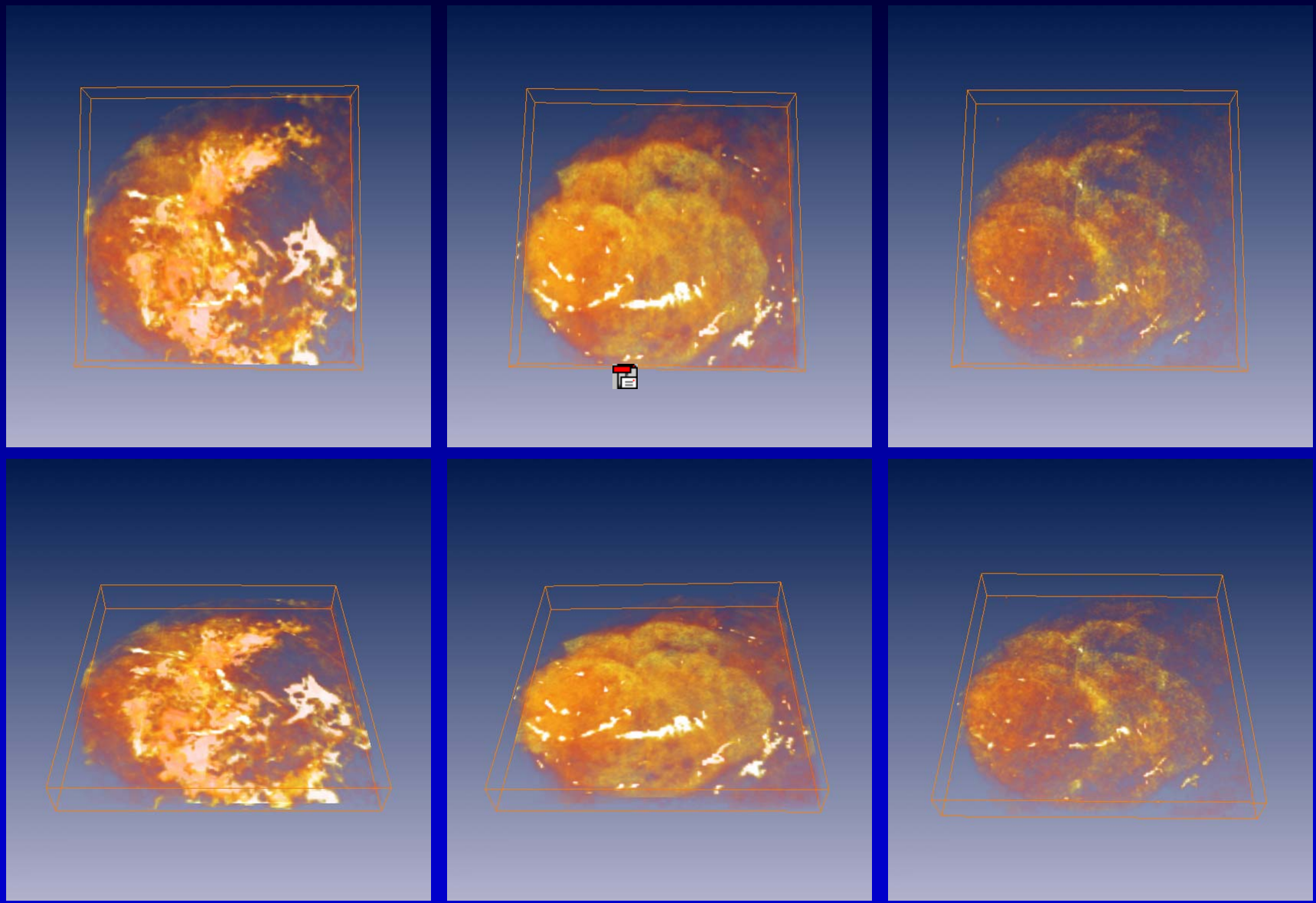
3D fluorescence images of c-MYC induced mammary tumor reflect the outline and the metabolic state of the tumor. These 3D images were reconstructed by 9 slices of fluorescent signal from the top to the bottom of the tumor. The size of each frame was 1.024 cm × 1.024 cm.

HepG2 tumor + 0.2ul 1mg/ml Pyro-2DG after 2hrs (#M11)



9L glioma + Pyro-2DG after 2hrs (Top Volume View)

Fp PN Pyro-2DG



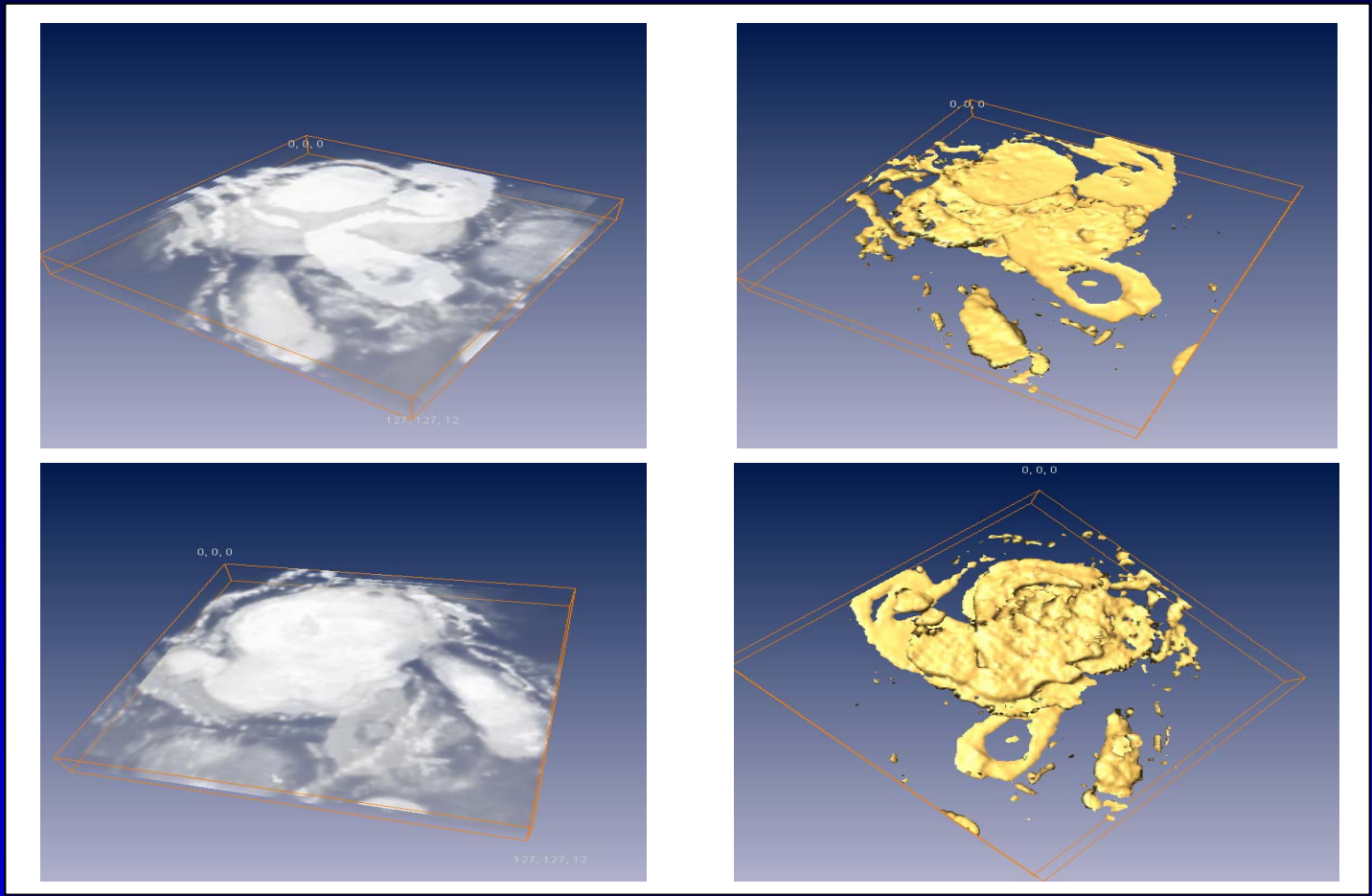
Quantitative evaluation of Cy5.5 labeled Cathepsin B beacon delivery by 3D high resolution imaging

Direct Volume Rendering

Surface Rendering

Top view

Bottom view



3D image of stealth beacon detection of animal cancer.
Note island of dissemination of cancer.

1 cm x 1 cm
Depth: 200 ~ 1000 μm